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PATENT APPLICATION

ATTORNEY DOCKET NO. 10008128-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Shackleford, J. Barry

Confirmation No.: 5766

Application No.: 09/986,531

Examiner: Hirl, Joseph P.

Filing Date: 11/9/2001

Group Art Unit: 2121

Title: COMBINATORIAL FITNESS FUNCTION CIRCUIT

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TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 01/07/2005.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

() (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

() one month	\$120.00
() two months	\$450.00
() three months	\$1020.00
() four months	\$1590.00

() The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **08-2025** the sum of \$0.00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

() I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313-1450. Date of Deposit: _____

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Number of pages: 22

Typed Name: Leland Wiesner

Signature: Leland Wiesner

Rev 12/04 (Aplbrief)

Respectfully submitted,

Shackleford, J. Barry

By Leland Wiesner

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Reg. No. 39,424

Date: 5/6/2005

Telephone No.: (650) 853-1113

Attorney's Docket No.: 10008128-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of
: J. Barry Shackleford
Serial No. : 09/986,531
Filed : November 9, 2001
Title : COMBINATORIAL FITNESS FUNCTION CIRCUIT

Art Unit : 2121
Examiner : Joseph P. Hirl

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Transmittal of Brief on Appeal

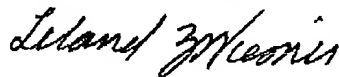
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APPELLANT'S BRIEF

In compliance with the communication mailed by the Patent Office on April 6, 2005, entitled "Notice of Non-Compliance" with the requirements of 37 CFR §41.37, Appellant submits herewith a new complete Brief.

The undersigned attorney would like to make of record a telephone interview he initiated with Supervisory Patent Examiner Anthony Knight on May 5, 2005 as Examiner Joseph P. Hirl was not available for discussion. The undersigned appreciates the Examiner's cooperation and assistance. As a result of this telephonic interview, and through submission of the accompanying Brief, appellant has now made a good faith effort to eliminate each of the informalities noted by the Examiner.

Respectfully submitted



Date: May 6, 2005

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Notification of Non-Compliant Appeal Brief (37 CFR 41.37)	Application No. 09/986,531	Applicant(s) SHACKLEFORD, J. BARRY	
	Examiner Joseph P. Hirl	Art Unit 2121	


--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The Appeal Brief filed on 07 March 2005 is defective for failure to comply with one or more provisions of 37 CFR 41.37.

To avoid dismissal of the appeal, applicant must file a complete new brief in compliance with 37 CFR 41.37 within **ONE MONTH or THIRTY DAYS** from the mailing date of this Notification, whichever is longer. **EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136.**

1. ☒ The brief does not contain the items required under 37 CFR 41.37(c), or the items are not under the proper heading or in the proper order.
2. ☐ The brief does not contain a statement of the status of all claims, (e.g., rejected, allowed or confirmed, withdrawn, objected to, canceled), or does not identify the appealed claims (37 CFR 41.37(c)(1)(iii)).
3. ☐ At least one amendment has been filed subsequent to the final rejection, and the brief does not contain a statement of the status of each such amendment (37 CFR 41.37(c)(1)(iv)).
4. ☒ (a) The brief does not contain a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number and to the drawings, if any, by reference characters; and/or (b) the brief fails to: (1) identify, for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function under 35 U.S.C. 112, sixth paragraph, and/or (2) set forth the structure, material, or acts described in the specification as corresponding to each claimed function with reference to the specification by page and line number, and to the drawings, if any, by reference characters (37 CFR 41.37(c)(1)(v)).
5. ☒ The brief does not contain a concise statement of each ground of rejection presented for review (37 CFR 41.37(c)(1)(vi)).
6. ☒ The brief does not present an argument under a separate heading for each ground of rejection on appeal (37 CFR 41.37(c)(1)(vii)).
7. ☐ The brief does not contain a correct copy of the appealed claims as an appendix thereto (37 CFR 41.37(c)(1)(viii)).
8. ☐ The brief does not contain copies of the evidence submitted under 37 CFR 1.130, 1.131, or 1.132 or of any other evidence entered by the examiner and relied upon by appellant in the appeal, along with a statement setting forth where in the record that evidence was entered by the examiner, as an appendix thereto (37 CFR 41.37(c)(1)(ix)).
9. ☐ The brief does not contain copies of the decisions rendered by a court or the Board in the proceeding identified in the Related Appeals and Interferences section of the brief as an appendix thereto (37 CFR 41.37(c)(1)(x)).
10. ☒ Other (including any explanation in support of the above items):

Organization of brief does not follow the specific requirements of 37 CFR 41.37(c)(1) where the first item is the "Real party of interest" followed and limited to the remaining sequence. The "Summary of claimed subject matter" is not concise and specifically related to each of the independent claims involved in the appeal. Rejection in all office action has been based on the applicant's claims. Grounds of rejection to be reviewed therefore must be based on or related to such claims. Arguments must be related to the grounds for rejection and therefore related to specific claims.



First Named Inventor	Shackleford, J. Barry	IN THE UNITED STATES PATENT AND TRADEMARK OFFICE In Re Application of: J. Barry Shackleford
Serial No.	09/986,531	
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Examiner Name	Hirl, Joseph P.	
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Docket No.	10008128-1	
Title: COMBINATORIAL FITNESS FUNCTION CIRCUIT		

VIA FACSIMILE**APPEAL BRIEF**

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I. REAL PARTY IN INTEREST

The present application has been assigned to Hewlett Packard Development Corporation, L. P., a corporation organized and existing under and by virtue of the laws of the State of Delaware, and having an office and principal place of business at 20555 S. H. 249; Houston, TX 77070, in an assignment recorded September 30, 2003, at Reel 014061, Frame 0492.

II. RELATED APPEALS AND INTERFERENCES

Applicant is unaware of any other related appeals or interferences that may directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

III. STATUS OF THE CLAIMS

Claims 10-18 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Claims 3 and 18 stand rejected under 35 U.S.C. § 112 first paragraph as failing to comply with the enablement requirement.

Claim 1-18 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,185, 547 of *Shackleford et al.* ("the '547 patent").

Appellant appeals the rejection of all of the pending claims 1-18 which are set forth in the attached Appendix A.

IV. STATUS OF AMENDMENTS

The amendments to the claims have all been entered and Appellant is unaware of any amendments filed after the Final Office Action mailed 09/07/2004 which finally rejected claims 1-18.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claims 1-18 are directed to a fitness function circuit for determining the fitness of a potential solution for a combinatorial genetic algorithm problem. Representative claim 1 describes a particular fitness circuit having a solution register (Appellant's Specification, Figure 4, page 8, lines 18-28) containing the potential solution for the genetic algorithm problem. Within the solution register is a plurality of component parts for solving the combinatorial genetic algorithm problem (Appellant's Specification, Figure 4, page 10, lines 4-23).

Multiple data tables correspond to the number of the component parts of the solution register (Appellant's Specification, page 8, lines 18-34 and page 9, lines 1-3). Each of the data tables provide a matrix of partial solutions to solve the combinatorial genetic algorithm problem (Appellant's Specification, page 10, lines 4-30) as determined by two respective component parts of the solution register (Appellant's Specification, page 8, lines 27-31). The partial solutions are summed by an adder connected to each of the data tables (Appellant's Specification, Figure 4, lines 31-34) thereby determining the fitness of the potential solution for the combinatorial genetic algorithm problem.

VI. GROUND S OF REJECTION TO BE REVIEWED ON APPEAL

- A. WHETHER CLAIMS 10-18 ARE DIRECTED TO NON-STATUTORY SUBJECT MATTER UNDER 35 U.S.C. § 101.**
- B. WHETHER CLAIM 3 AND CLAIM 18 FAIL TO COMPLY WITH THE ENABLEMENT REQUIREMENT 35 U.S.C. § 112, FIRST PARAGRAPH.**
- C. WHETHER CLAIMS 1-18 ARE ANTICIPATED BY THE '547 PATENT UNDER 35 U.S.C. § 102(E).**

VII. ARGUMENT

- A. CLAIMS 10-18 ARE DIRECTED TO STATUTORY SUBJECT MATTER UNDER 35 U.S.C. § 101 AS THEY TEACH THE USE OF CIRCUITRY AND SOFTWARE COMPONENTS TO ACCOMPLISH A TANGIBLE RESULT IN A USEFUL AND CONCRETE MANNER.**

The Examiner rejected claims 10-18 as directed to non-statutory subject matter citing the "practical application test" requiring that a "useful, concrete and tangible result" be accomplished. Additionally, the Examiner further asserts that these claims represent "abstract methodology and therefore are intangible". Unfortunately, the Examiner's assertions are conclusory and lack sufficient analysis and support to establish even a prima facie case.

In *State Street Bank & Trust Co., v. Signature Financial Group, Inc.*, 149 F.3d 1368, 47 U.S.P.Q.2d (BNA) 1596 (Fed. Cir. 1998), the Federal Circuit articulated the following test for patentability under this section developed from *In re Alappat*, 33 F.3d 1526, 31 U.S.P.Q.2d (BNA) 1545 (Fed. Cir. 1994), and *Arrhythmia Research Technology, Inc., v. Corazonix Corp.*, 958 F.2d 1053, 22 U.S.P.Q.2d (BNA) 1033 (Fed. Cir. 1992). A claim defines subject matter eligible for patent protection if the claim contains a practical application or, equivalently, if the invention defined by the claim produces "a useful, concrete and tangible result."

1. A result is useful if it lies within the technological arts.

Although the court in *State Street* did not further define the term “useful,” courts have previously interpreted “useful” as meaning “in the technological arts. See *Evans v. Eaton*, 16 U.S. 454; 4 L. Ed. 433; 3 Wheat. 454 (1818) (explaining that “a patent may be for a new and useful art; but it must be practical”); *In re Toma*, 575 F.2d 872 (C.C.P.A. 1978) (holding that a “method for enabling a computer to translate natural languages is in the technological arts, *i.e.*, it is a method of operating a machine”)

In the instant case, computations performed by the method recited in claims 10-18 are directed toward solving a combinatorial class of problems using circuitry with registers and adders designed in accordance with the principles of GA programming. For example, claim 10 supports this analysis and recites “A method for determining the fitness of a potential solution for a combinatorial genetic algorithm problem” and that this method includes at least the operations of “inputting a plurality of potential solution values into a solution register” and “adding, by an adder connected to each of the respective data tables”. The language and context of this claim clearly indicate that the Appellant is claiming statutory subject matter as it relates to operating computing machinery and circuitry and as both registers and adders are recognized as being very real and tangible parts of circuitry.

Appellant teaches and claims a fitness function useful in scheduling planes, trains, shipping containers, computing resources and other resources to solve the Traveling Salesman Problem (or TSP), as is known in the art. Thus, claims 10-18 are within the technological arts and useful.

2. A result is concrete or tangible, and thus not abstract, if it lies within the physical realm.

The terms “tangible” and “concrete” come from the *Alappat* case. In that case, the Federal Circuit explained that “abstract ideas” were “disembodied,” or divorced from

physical manifestations. Patentable subject matter, on the other hand, was tangible and concrete.

Given the foregoing, the proper inquiry in dealing with the so called mathematical subject matter exception to § 101 alleged herein is to see whether the claimed subject matter as a whole is a disembodied mathematical concept, whether categorized as a mathematical formula, mathematical equation, mathematical algorithm, or the like, which in essence represents nothing more than a "law of nature," "natural phenomenon," or "abstract idea."

Claims to a specific machine that lies in the physical realm, however, are not abstract, as the Federal Circuit explained:

Although many, or arguably even all, of the means elements recited in claim 15 represent circuitry elements that perform mathematical calculations, which is essentially true of all digital electrical circuits, the claimed invention as a whole is directed to a combination of interrelated elements which combine to form a machine for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means. n23 This is not a disembodied mathematical concept which may be characterized as an "abstract idea," but rather a specific machine to produce a useful, concrete, and tangible result.

As previously described, claim 10 not only recites using registers and adders but also refers to a specific machine that solves the combinatorial class of problems associated with scheduling resources referred to as the TSP problem. Claims 10-18 concern evaluating a potential solution to a combinatorial problem and generating a fitness value that determines the fitness of the potential solution to this TSP problem. Accordingly, the present invention provides a practical and effective method of selecting an optimal allocation of resources whether it is on a computer chip or in the scheduling of railways or other technological arts. Clearly, claim 10 is not an abstract concept as it is

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not only uses registers and adders in the physical realm but is grounded in physical manifestations as it solves the physical problem of scheduling resources in an optimal manner.

- 3. It is inappropriate to use a dictionary to define the term 'register' in support of the rejection under 35 U.S.C. § 101 as it contradicts other terms in the claims and the overall specification.**

In the Examiner's office action dated 09/07/2004, the Examiner cited Merriam Webster's Collegiate Dictionary, Tenth Edition, 1998, page 984 to define the term 'register' as: "a written record containing regular entries of items or details" (emphasis added). Based on this reasoning, the Examiner concluded that claims 10-18 could be performed with pen and paper in an attempt to further support the rejection under 35 U.S.C. § 101. Appellant respectfully submits that the Examiner has inappropriately used the dictionary to define the term 'register' and conclude that claims 10-18 are not an embodiment in the technical arts.

In general, claims should not be interpreted in a vacuum but read in light of and as part of the specification. *Slimfold Mfg. Co. v. Kinkead Indus., Inc.*, 810 F.2d 1113, 1116, 1 USPQ2d 1563, 1566 (Fed. Cir. 1987) (citing *Hybritech Inc. v. Monoclonal Anti-bodies, Inc.*, 802 F.2d 1367, 1385, 231 USPQ 81, 94-95 (Fed. Cir. 1986); *In re Mattison*, 509 F.2d 563, 565, 184 USPQ 484, 486 (CCPA 1975)). FIG. 4 and the corresponding text of the specification disclose registers and adders in a circuit diagram schematic (pg. 8, lines 1-34 of the Application). These registers are defined implicitly through functional language of the specification as storage areas used to store different values while processing data (pg. 8, lines 4-26 of the Application). The specification does not mention or allude to using pen and paper as this would contradict the purpose of using circuitry and processors to quickly identify a solution.

Even if a register were defined as a "pen and paper", it would make no sense to combine the term register with the remainder of the terms in the various claims. ("[A] common meaning, such as one expressed in a relevant dictionary, that flies in the face of the patent disclosure is undeserving of fealty."); *Id.* (citing *Liebscher v. Boothroyd*, 258 F.2d 948, 951, 119 USPQ 133, 135 (C.C.P.A. 1958) ("Indiscriminate reliance on definitions found in dictionaries can often produce absurd results.")). In claim 10, for example, a register implemented as a "pen and paper" would be impossible to interface

and use with the circuitry of an “adder” also recited in claim 10. Consequently, combining a register implemented with pen and paper would result in an inoperable circuit or device. Accordingly, it is inappropriate to define the term “register” using the dictionary entry selected as it contradicts the meaning already conveyed in the specification and claims.

Indeed, if a dictionary is required to define the term ‘register’ than at least a definition taken from the context of computer science should be used. Accordingly, another common usage of the term in the context of computer science is: a part of the central processing unit used as a storage location¹. Another definition is: A small, high-speed computer circuit that holds values of internal operations, such as the address of the instruction being executed and the data being processed. When a program is debugged, register contents may be analyzed to determine the computer's status at the time of failure². Either of these latter definitions would be more appropriate in light of the specification and claims than the definition chosen by the Examiner.

**B. CLAIM 3 AND CLAIM 18 COMPLY WITH THE ENABLEMENT REQUIREMENT 35
U.S.C. § 112, FIRST PARAGRAPH AS ONE SKILLED IN THE ART WOULD BE ABLE
TO MAKE AND USE THAT WHICH IS CLAIMED.**

The Examiner rejected claim 3 and 18 under 35 USC 112, first paragraph for allegedly failing enablement. In the office action dated 02/02/2004 on pg. 4, lines 19-22 the Examiner asserts that page 11, lines 1-2 of the application indicate that the addition is done in serial rather than in parallel as recited in claim 3. Unfortunately, this portion of the application as filed is not referring to the addition operation referred to in claim 3 and therefore enablement is not an issue.

Instead, page 11, line 1-2 of the application refers to the way in which a person must travel “in order” from city to city and the “particular distance a traveler must make to visit all of the cities in that order”. Appellant respectfully submits that the Examiner

¹ The American Heritage Dictionary of the English Language, Fourth Edition, 2004, Houghton Mifflin Company

² Computer Desktop Encyclopedia, 1981-2005 Computer Language Company Inc.

has improperly interpreted the phrase "in order" out of context. One skilled in the art reading page 11, line 1-2 would understand this does not describe the operation of an adder but merely the reality that traveling between cities in the TSP or other similar class of problems occur as a sequence of events.

Conversely, the example adder depicted in FIG. 4 and recited in claim 3 unambiguously operates in parallel. One skilled in the area would realize from viewing FIG. 4 that distance table RAM 421-428 each have an input to adder 430 and operate in parallel rather than in serial. It is also mentioned later that adder 430 in FIG. 4 operates in parallel at page 10, line 33 of the application as filed. Thus, page 11, lines 1-2 do not support the Examiner's assertion of ambiguity and lack of enablement. Instead, Appellant respectfully submits that one skilled in the art would clearly see FIG. 4 and corresponding references in the specification satisfy 35 USC 112, first paragraph for claim 3.

The Examiner also asserts that claim 18 fails enablement under 35 USC 112, first paragraph because the changing out the fitness function or matrix of partial solutions was not addressed. This is also clearly an incorrect assertion with no support. Those skilled in the art of GA programming know how to change a fitness function and corresponding data depending on the particular GA problem. Appellant has indicated a novel and non-obvious approach of using "another matrix of partial solutions" as recited in claim 18 however the process of using another dataset or fitness function in a GA machine need not extensive explanation. Those skilled in the art know that different datasets and fitness functions allow a GA machine to solve different problems.

In addition, the Appellant notes that a matrix of partial solutions is described at least on page 9, lines 4 to 34, page 10, lines 1-34, FIG. 4, FIG. 5, FIG. 6 and elsewhere in the application. Consequently, one skilled in the art would readily understand the meaning of the word 'matrix' in claim 18 corresponds to the terms 'grid' or 'table' as used in the specification and therefore understand this teaching as well. Merely using a different term does not create an enablement issue as long as one skilled in the art could understand, make and use the invention.

Likewise, the specification clearly teaches that a matrix of partial solutions would result when connecting a matrix to one part of a register having a complete 'solution' as disclosed in FIG. 4 and on at least page 8, lines 4-16 of the application as filed. For example, distance table RAM 420 is table or matrix of partial solutions containing smaller tables or matrices depicted as distance table RAM 421-428. The address of a potential solution is contained in register 410 and divided into partial addresses and, upon lookup in the multiple distance table RAM 421-428, into partial solutions as recited in claim 3 and 18. These partial solutions retrieved from the tables or matrices are added in parallel using adder 430 to produce a fitness value. This is consistent with a more concrete example of the fitness function operation and possible solution provided on pg. 9, lines 28-34 and page 10, lines 1-34.

C. CLAIMS 1-18 ARE NOT ANTICIPATED BY THE '547 PATENT UNDER 35 U.S.C. 35 U.S.C. § 102(E) BECAUSE AT LEAST ONE ELEMENT IN THE CLAIMS IS NOT IN THE '547 PATENT

1. Independent Claims 1, 10, and 16 are not anticipated by the '547 patent under 35 U.S.C. § 102(e) because at least one element in the claims is not in the '547 PATENT.

The Examiner rejected claims 1-18 under 35 USC 102(e) as anticipated by Shackleford (US Pat. 6,185,547).

However, the Examiner has failed to establish the prima facie case as each and every element of independent claims 1, 10 and 16 are not taught by the '547 patent. See Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q.2D (BNA) 1913, 1920 (Fed. Cir.), cert. denied, 493 U.S. 853, 107 L. Ed. 2d 112, 110 S. Ct. 154 (1989) (explaining that an invention is anticipated if every element of the claimed invention, including all claim limitations, is shown in a single prior art reference). See Jamesbury Corp. v. Litton Industrial Products, Inc., 756 F.2d 1556, 1560, 225 USPQ 253, 256 (Fed.

Cir. 1985) (explaining that the identical invention must be shown in as complete detail as is contained in the patent claim). See *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2D (BNA) 1051, 1053 (Fed. Cir. 1987) (explaining that a prior art reference anticipates a claim only if the reference discloses, either expressly or inherently, every limitation of the claim). See *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1571, 230 U.S.P.Q. (BNA) 81, 84 (Fed. Cir. 1986) ("Absence from the reference of any claimed element negates anticipation.")

Claim 1 recites "inputting a plurality of potential solution values into a solution register, said solution register comprising a plurality of component parts thereof" however the '547 patent cited by the Examiner does not disclose "a solution register" as recited in claim 1. Instead, the '547 patent in FIG. 7, col. 4, lines 63-64 describes a 'least-fit chromosome register' as cited by the Examiner and this is not a 'solution register'. The least-fit chromosome register 49 in FIG. 7 of the '547 patent is a particular type of register used to hold the 'least-fit' of two parent chromosomes. The parent chromosome with the lower fitness value is taken from either the first or second chromosome registers 41 and 42 in FIG. 7 and placed in the 'least-fit chromosome register' to facilitate removal of the 'least-fit' parent from the population and replacement with a child chromosome (Col. 12, lines 25-30 of the '547 patent).

In contrast, a solution register holds a solution value used to access one or more distance tables and used to generate a fitness value (FIG. 4, pg. 8, lines 1-34 of the application as filed). The solution register does not contain the least-fit parent chromosome to be replaced as described in the '547 patent.

Furthermore, the '547 patent does not describe a fitness function that uses "a plurality of data tables....each of said data tables comprising a matrix of partial solutions to said combinatorial genetic algorithm problem" as recited in claim 1. Instead, the fitness function in the '547 patent described on Col. 26, lines 19-67 and Col. 27, lines 1-67 describe a different analysis for a different problem. The '547 patent describes a fitness function concerning solving a set coverage problem and not a combinatorial genetic algorithm problem as recited in claims 1, 10 and 16. There is also no discussion of using partial solutions to solve a combinatorial or other GA problem in the '547 patent.

The set coverage type problem from the '547 patent attempts to select a minimum set of events to perform a set of operations. For example, testing a DRAM may require expensive chip testing equipment to perform 100 or more different tests. While the 100 or more different tests cannot all be performed at the same time, they can be performed in different groups. If all the groups of tests are performed then some of the tests will be performed multiple times which is unnecessary and wasteful of the testing machine cycles. Accordingly, the fitness function in the '547 patent identifies the smallest group of tests to be performed while getting all of the 100 tests completed; this is a set coverage problem as applied to testing DRAM but is not equivalent or the same as the combinatorial genetic algorithm problem in claims 1, 10 and 16.

In addition, claim 10 recites "indexing said matrices of partial solutions to said genetic algorithm within said plurality of data tables, the two respective ones of said component parts determining respective particular partial solutions within the respective matrices" yet the Examiner has not pointed out with particularity where the '547 patent even possibly mentions this particular limitation.

Further, representative claim 10 recites “adding, by an adder connected to each of the respective data tables, respective outputs from each of said data tables, whereby the sum of said adder determines the fitness of said potential solution for said genetic algorithm problem” however the ‘547 patent does not describe or teach this limitation. Instead, the ‘547 patent describes using a first carry-save adder to add the “column signal counts either of input 0 and input 1 based upon the bit value of the bit number of 1s in the coverage vector” (Col. 27, lines 18-21 of the ‘547 patent) and a second carry-save adder to add “chromosome cost sums [sic] the bit values of 1s in an n-bit chromosome and outputs an added value to the aggregate cost register 134 as the chromosome cost” (Col. 27, lines 24-26 of the ‘547 patent). Neither of at least these references teaches each and every element as recited in claim 10. Similar elements from claim 10 found in claim 1 and claim 16 are also not described or taught by the ‘547 patent either.

For at least these reasons provided above, the ‘547 patent does not anticipate claims 1, 10 or 16.

2. Claims 2-9, 11-15, and 17-18 are not anticipated by the ‘547 patent under 35 U.S.C. § 102(e) because at least one element in the claims is not in the ‘547 patent .

Appellant respectively submits that claims 2-9, 11-15 and 17-18 are not anticipated under 35 U.S.C. § 102(e) because claims 2-9, 11-15 and 17-18 depend from claims 1, 10, and 16 respectively and the ‘547 patent does not disclose or teach all of the elements contained in claims 1, 10 and 16 as indicated previously.

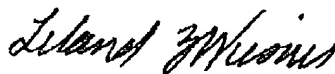
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VIII. CONCLUSION

Appellant respectfully submits it has demonstrated that the cited reference does not teach or suggest each and every element of the pending claims 1-18 and that the rejections under 35 U.S.C. § 102(e) cannot be maintained.

For at least the reasons discussed above, Appellant submits that the pending claims are patentable. Accordingly, Appellant requests that the Board of Appeals reverse the Examiner's decisions regarding claims 1-18.

Respectfully submitted,



Date: 5/6/2005

Leland Wiesner

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CLAIMS APPENDIX A

What is claimed is:

1. (Previously Presented) A fitness function circuit for determining the fitness of a potential solution for a combinatorial genetic algorithm problem, said fitness circuit comprising:
a solution register containing said potential solution for said genetic algorithm problem therein, said solution register comprising a plurality of component parts thereof, a plurality of data tables, the number of data tables corresponding to the number of said component parts of said solution register, respective data tables having inputs from two respective ones of said component parts of said solution register, each of said data tables comprising a matrix of partial solutions to said combinatorial genetic algorithm problem, the two respective ones of said component parts determining a particular respective partial solution, each of said matrices having identical entries therein; and
an adder connected to each of said plurality of data tables, said adder adding respective partial solutions from each of said plurality of data tables, thereby determining the fitness of said potential solution for said combinatorial genetic algorithm problem.
2. (Previously Presented) The fitness function circuit according to claim 1, wherein said data tables include partial solutions specific to the sequential order of the potential solution.
3. (Previously Presented) The fitness function circuit according to claim 1, wherein said adder adds said partial solutions from the respective data tables in parallel.
4. (Previously Presented) The fitness function circuit according to claim 3, wherein said partial solutions from the respective data tables are added substantially simultaneously.
5. (Previously Presented) The fitness function circuit according to claim 1, wherein each of said matrices within said data tables comprises an abbreviated matrix of partial solutions to said combinatorial genetic algorithm problem.

6. (Previously Presented) The fitness function circuit according to claim 5, wherein said abbreviated matrix contains at least $(n)(n-1)/2$ entries.

7. (Previously Presented) The fitness function circuit according to claim 1, wherein at least two of the two respective ones of said component parts correspond to different entries within said matrices.

8. (Previously Presented) The fitness function circuit according to claim 7, wherein all of the two respective ones of said component parts correspond to different entries within said matrices.

9. (Previously Presented) The fitness function circuit according to claim 8, wherein said combinatorial genetic algorithm problem is the Traveling Salesman Problem.

10. (Previously Presented) A method for determining the fitness of a potential solution for a combinatorial genetic algorithm problem, said method comprising the steps of:

inputting a plurality of potential solution values into a solution register, said solution register comprising a plurality of component parts thereof;

receiving, after said step of inputting, at each of a plurality of data tables two respective ones of said component parts of said solution register, the number of data tables corresponding to the number of said component parts of said solution register, each of said data tables comprising a matrix of partial solutions to said combinatorial genetic algorithm problem, each of the matrices having identical entries therein;

indexing said matrices of partial solutions to said genetic algorithm within said plurality of data tables, the two respective ones of said component parts determining respective particular partial solutions within the respective matrices; and adding, by an adder connected to each of the respective data tables, respective outputs from each of said data tables, whereby the sum of said adder determines the fitness of said potential solution for said combinatorial genetic algorithm problem.

11. (Previously Presented) The method according to claim 10, wherein in said step of receiving, at each of said plurality of data tables, two respective ones of said component parts of said solution register are received substantially simultaneously.

12. (Previously Presented) The method according to claim 10, wherein in said step of receiving, wherein at least two of the two respective ones of said component parts correspond to different entries within said matrices.

13. (Previously Presented) The method according to claim 12, wherein all of the two respective ones of said component parts correspond to different entries within said matrices.

14. (Previously Presented) The method according to claim 13, wherein said combinatorial genetic algorithm problem is the Traveling Salesman Problem.

15. (Previously Presented) The method according to claim 10, wherein in said step of receiving, at each of said plurality of data tables, two respective ones of said component parts of said solution register correspond to the sequential order of the potential solution values in said solution register.

16. (Previously Presented) A methodology for determining the fitness of a particular potential solution for a combinatorial genetic algorithm problem from a pool of potential solutions, said methodology comprising steps of:

(a) inputting a plurality of potential solution values into a solution register, said solution register comprising a plurality of component parts thereof;

(b) receiving, substantially simultaneously, at each of a plurality of data tables two respective ones of said component parts of said solution register, the number of data tables corresponding to the number of said component parts of said solution register, each of said data tables comprising a matrix of partial solutions specific to said genetic algorithm problem, each of the matrices having identical entries therein;

(c) indexing said matrices of partial solutions to said genetic algorithm within said plurality of data tables, the two respective ones of said component parts determining respective particular partial solutions within the respective matrices;

(d) adding, by an adder connected to each of the respective data tables, respective outputs from each of said data tables in parallel, whereby the sum of said adder determines the fitness of said particular potential solution for said genetic algorithm problem;

(e) comparing the fitness of said particular potential solution to a fitness threshold; and

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(f) replacing a prior potential solution from said pool of potential solutions with said particular potential solution if said fitness of said particular potential solution exceeds said fitness threshold, and otherwise deleting said particular potential solution.

17. (Previously Presented) The methodology according to claim 16, said methodology repeating said steps (a)- (f) with another particular potential solution with the same matrix of partial solutions.

18. (Previously Presented) The methodology according to claim 16, said methodology repeating said steps (a)- (f) with another particular potential solution with another matrix of partial solutions, said another matrix corresponding to partial solutions for another genetic algorithm problem.